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ABSTRACT

The new technology of information and communications can be applied directly to training and educating people more efficiently and effectively. Three major adjustments need to be made in current thinking about human development to meet the challenge of using the new technology. First, the development of people must be viewed as an investment and not an operating expense. Second, development must be seen as something the individual controls himself or herself and not as something that another person (instructor, counselor, or manager) does to him or her. Third, development should not be viewed as applying a treatment, as in teaching, but as preparing a learning environment. The learning environment is at the heart of developing people. To develop learning environments that deal with the range of learning outcomes required in the modern workplace will be impossible to achieve without the use of modern tools and technologies. Faced with the challenges in society that the new technologies have created, educators and trainers must improve education and development at each stage of the human development process. (The final three pages list some thoughts on tomorrow's jobs, workplace, and learning environments.) (YLB)

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THE USE OF NEW TECHNOLOGY IN DEVELOPING HUMAN RESOURCES

a presentation by David E. Barbee, PhD to the
Asociacion Mexicana de Capacitacion de Personal, A.C.'s
National Conference
Mexico City, November 14, 1989

Today we are dealing with a new kind of wealth. Trained and educated people. In the U.S., we are learning that the best investment that we can make is in our people. Developing people pays off not only in human terms, but in dollars. Federal Express finds that in order to ensure overnight delivery anywhere in the U.S. that it needs to keep its employees trained and motivated. IBM finds that investing in the development of its salesforce, engineers and clerks all pays off in increased profits. Even the Internal Revenue Service finds that providing its auditors with up to date tools and techniques, and giving them the training necessary to efficiently use them, improves tax collections.

In the U.S., we are facing the prospect of a smaller number of people with fewer skills entering our workforce than previously. There will be more women, minorities and immigrants presenting us with special training and development challenges.

Today we are faced with a substantial and increasing number of people who lack the basic skills of reading; mathematics; writing, listening and other communications skills; and perhaps more critical to a modern workforce - they also lack the other skills of learning. The numbers are staggering - 25 million unemployable, another 40 million in jobs, but without the skills needed to learn the next job as theirs' change. Nor are we gaining on the problem, instead we are falling further behind each year as the workplace becomes more sophisticated requiring increasing skills on the part of the worker.

Few jobs remain untouched, even fast foods, janitorial services, and other jobs traditionally classed as unskilled, are requiring increasing levels of skills as they begin to use more sophisticated tools and techniques. Mops have been replaced with expensive, difficult to operate machines, and computers are used extensively in fast food operations.

While these new technologies seem to create problems for us, in actuality, they hold the potential of improving our lives. Not only because they can provide us with improved goods and services at a lesser cost, but also because new technology can also be applied directly to developing people more efficiently and effectively. With the new technology of information and communications, we can do a much better job of training and education.

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But to capitalize on this opportunity requires a new way of thinking about the development of people. We need to begin thinking of human development:

1. as an investment and not as an operating expense

2. as something that takes place in a managed learning environment rather than in a classroom where the instructor teaches.

3. as something that the learner controls and NOT as something that an instructor, counselor or manager does to a learner. In short we must move in human development from teaching to learning.

The first major adjustment that we must make in order to rise to the massive challenge that faces us in human development is to begin to view the development of people as an**investment**

Successful companies around the world have long viewed the development of their people as an investment, but even the best companies have had problems in moving away from charging the costs of such development as a current operating expense. It is difficult for businesses to treat an investment in human capital as they would a new plant or its equipment, amortizing it over its useful life to the company. Part of this is quite legitimate as a person trained by one company may move on to another. It is, of course, in the investing company's interest to establish a climate that fosters a true partnership between employees and the company so that they will stay. Government also has a role to play in human development, as society is the ultimate beneficiary of productive people who pay taxes and keep the nation competitive in what now is an international marketplace. Two of the many techniques that governments have available are direct training subsidies and tax incentives.

The second major adjustment that we must make in our thinking is to look at developmentas **something the individual controls themselves, and not something that another person - instructor, counselor or manager - does to them.**

This adjustment requires a significant change in our thinking. We provide an individual with the tools, techniques and conditions that will enable them to secure access to all elements/aspects of the human development process leading to productive employment and a fulfilling life. While this process includes career exploration and other vocational counseling services, job search, training and educational, a range of social and human services, and other services; I will focus today principally on the establishment and management of learning environments. These learning environments differ from the more common teaching system in several important ways:

1. While the environment is established by the instructional developer, instructor, counselors and others, the

instruction is controlled by the learner.

2. Instructors spend most of their time managing and guiding rather than presenting which is left to the "responsive" or "interactive" environment.

The third major adjustment needed in our thinking in developing people, is just this, namely **"from" applying a treatment (as in teaching), to preparing a learning environment.**

Simply stated, but difficult to achieve, we're asking instructors to stop teaching and instead manage learning environments in which trainees and students learn by interacting directly with the carefully engineered activities that comprize it. Dr. Maria Montessori developed such learning environments more than 100 years ago, so the idea is not new, only its widespread application is. Once more, the instructor does not teach, i.e. he does not present the lesson, but rather makes available, lessons that are appropriate to the learning requirements of each learner as an individual.

At the heart of developing people, then, is the **learning environment** so let me take a few minutes to describe its characteristics.

There are 13 characteristics that I look for in a "good learning environment." (You may wish to follow along in your handout as I described these.)*

[Insert "Characteristics of a good learning environment" here.]

*leave this out of text of printed paper.

The Characteristics Of A Good Instructional System

Notes:

- ☐ 1. The curriculum and the instructional program are based on competencies required for a specific job.
- ☐ 2. It lets the trainee know what to expect. It describes both the system's and the trainee's responsibilities.
- ☐ 3. It provides the trainee with the occupational context, including a general description of the occupational area, a description of the job, the conditions under which it is generally performed, and the generally accepted standards for its performance.
- ☐ 4. It is made up of carefully engineered learning experiences designed to develop the specified competencies in the target trainees.
- ☐ 5. The trainee controls the pace, sequence, and strategy of the learning.
- ☐ 6. It demonstrates or describes the skill or knowledge to be learned in a way that the trainee understands.
- ☐ 7. It is interactive, i.e., it **actively** involves the trainee throughout the training.
- ☐ 8. It provides opportunity for the trainee to practice the skill or internalize the knowledge.
- ☐ 9. It provides opportunity for the trainee to perform the skill or use the knowledge under conditions closely resembling the job.
- ☐ 10. It provides opportunity for trainees to test themselves on the skills and knowledge taught.
- ☐ 11. It provides alternative learning strategies to meet the range of individual learning characteristics found in the trainee group(s). This normally requires a variety of media to satisfy the range of such characteristics.
- ☐ 12. It measures performance and provides results to the trainee and to the instructor based upon the specific job competencies.
- ☐ 13. Competency achievement data are used to improve the effectiveness and efficiency of the system. For example, when trainees fail to achieve a competency within a reasonable time, the training system is examined to see what went wrong and then adjusted accordingly.

The Advantages of Developing a Good Instructional System

1. It consistently produces the results for which it was designed.
2. It does not leave you dependent upon the skills of one person.
3. It is replicable.
4. It capitalizes on the range of skills and unique talents of various people.
5. It places responsibility for learning with the learner and responsibility for the learning environment and management with the instructor.
6. It uses what is known about how adults learn.
7. It provides a means for adjusting itself to better meet present needs and keep itself updated.

Source: David Barbee, Ph.D., Center for Advanced Learning Systems, U.S. Department of Labor

To develop learning environments that dealt with the range of learning outcomes required in the modern workplace would be impossible to achieve without the use of modern tools and technologies. Microcomputers, videodisc machines, Compact Disc-Read-Only-Memory (CD-ROM), hypermedia, expert systems, fiber optics and other tools and systems, properly applied are necessary in developing "good learning environments/instructional systems."

Let's imagine together a learning environment in which twenty, a hundred or even thousands of young adults ranging in age from sixteen to twenty-four and each pursuing their own learning goals. All have failed in our formal educational and training systems and are in need of the basic skills of reading, writing, arithmetic, communications, problem solving, and other skills that will both equip them for entry level employment in unskilled and semiskilled jobs and provide them with skills they will need to learn new skills as their job changes. Each of them when they began the program were assessed. Thanks to new developments in aptitude and interest testing, within two hours following their arrival they had a complete assessment and they were discussing it with their counselor. Their basic skills were similarly assessed, but over a period of days permitting each to begin a personalized plan for reading based on what they specifically needed to learn. Lessons in reading were tied to their areas of interest using vocabulary and the requirements for reading in the job area for which they were preparing. Persons interested in auto mechanics were learning to read Michell Manual type materials, while electricians were learning to read instructions from a manual on electricity. All of the learners were learning to read and complete job applications, and the range of requirements each of us faces daily from want ads in the newspaper to warning labels, street signs and restaurant menus. Computers were there as learning tools to be used as needed by the learners. When photograph quality pictures were required in various sequences based upon learner responses to questions on the screen, free exploration and discovery learning or from a multimedia encyclopedia--an interactive videodisc station was available. CD-ROM added 250,000 pages of material to the retrieval potential of several microcomputers. Learners were learning to search in very efficient ways with the help of expert systems, getting material from entire databases stored on CD-ROM. Pictures of replacement parts and engine sounds were also stored there, as well are part descriptions that the aspiring auto mechanics were learning to read. Learners administered self checks and when they decided that they were ready, asked the instructor for the mastery test. Tests required that the trainee actually perform tasks, rather then than regurgitate knowledge or describe how they would do it. Many of the tests used microcomputer with periferrals like the videodisc or elements that simulated actual tools or equipment required on the job. All of the results were either picked up directly by trainee responses or added later as learning manager input to the system. Some of learning activities used simulators that had

microcomputers, videodisc and other tools embedded within them. When learners achieved mastery they moved on to other parts of their individualized prescriptions for learning.

Then when each person had learned the basic skills required to go get a job, they did it. For some it was a clean break with the program, while for most, their learning continued in a mixture of on and off the job experiences, until success on the job was assured, and they had acquired the skills required for further learning.

Time does not permit a more indepth look at the potential for new technology in learning environments in this paper, but I would encourage each of you to pursue it on your own.

Faced with the challenges in society the time to change our systems for training, education and development is now. At each stage of the human development process there are opportunities to do it better. While time today does not permit the examination of all of the options available, I'd like to spend a few minutes describing some of the opportunities. You may wish to refer to the paper on page ___ as I go over the process.

THE HUMAN DEVELOPMENT PROCESS

1. Determining the status of the person in their abilities to become productive, fully functioning human beings.

2. Removing, modifying or working around barriers to employment -such things as transportation; access due to language; or other impediments that lend themselves to a fairly immediate management solution.

3. Determining the persons goals and aspirations, interests, abilities, competencies, educational level, certification and other characteristics/capabilities.

4. Providing or connecting persons with needed services--Training, Education, Counseling or other.

5. Matching people with jobs.

6. Placing people in jobs.

7. Inservice training/development

   a. Learning how to learn

   b. Learning required occupational skills - including not only specific job skills, but teamwork and other "process" skills.

8. Career development.

Everything that I have mentioned can be done today, but in reality we are not preparing people for today, we are preparing them for tomorrow. So in the time remaining I'd like to share with you some thoughts on tomorrows jobs, work places and finally tomorrow's learning environments.

TOMORROW'S JOBS

1. From manufacturing to service sector employment

2. From jobs in large manufacturing plants to smaller flexible manufacturing

3. From jobs in large companies to jobs in small companies

4. From manual skill to information processing jobs

5. From specialized skill requirements that are fairly narrow to a much broader range of skills.

6. From few high skilled jobs to many high skilled jobs.

7. From jobs that require a few basic skills to jobs that require both higher and broader "basic skills." These skills include, in addition to reading, writing and arithmetic: listening, speaking and other communication skills; teamwork; problem solving; higher order thinking skills and the other skills of learning.

TOMORROW'S WORKPLACE

1. Cleaner, less toxic and dangerous; with more information, service and transactionally oriented jobs.

2. Quicker and easier access to more information; with more jobs dealing in information as a commodity.

3. More service jobs.

4. More options of part time employment and shorter total work hours.

5. Wages and other renumeration will be increasingly tied to productivity rather than time or "effort".

6. More teamwork and cooperation and less competition.

7. Yet, at the same time, more independent action and accountability.

8. Responisibility and authority more broadly distributed (more horizontal organization).

9. More demanding mentally, less physically.

10. There will continue to be lower level service jobs, but they also will become, in many cases, more sophisticated, requiring increased skills, as more and more processes are automated.

11. Increasing numbers of jobs informated, but with a continuing number still using people as a "COG in the system" rather than its manager and innovator.

TOMORROW'S LEARNING ENVIRONMENTS

1. They will be fully interactive learning environments, increasingly embedded in the workplace itself.

2. They will employ many of the new tools and techniques like the interactive videodisc, CD-ROM, DVI, Expert Systems, Hypermedia, Neural Networks, Voice Recognition, Modern Competency Assessment Systems and, of course, driving it all, the ubiquitous computer.

3. They will be carefully engineered and tested to predictably produce the desired learning outcomes.

4. They will require competent designers, developers and managers.

5. They will typically be characterized by the 13 conditions described previously.

TRENDS

1. Toward embedded training and human development

2. Toward informating jobs

3. Toward an integration of tools and technologies as they are applied to human development.

4. Toward, as previously mentioned, an increasing investment in the development of people.